

# PORTFOLIO VISUALIZATION (PVIZ) DEMO

Krishna Collie and Calvin Johnson

Portfolio Analysis Workshop

February 6, 2012



Division of Computational  
Bioscience

Center for Information  
Technology

National Institutes of  
Health

**HPCIO**

# CIT DIVISION OF COMPUTATIONAL BIOSCIENCE



## Division of Computational Bioscience

Center for Information  
Technology

National Institutes of  
Health

## HPCIO

- The Division of Computational Bioscience (DCB) of CIT is a research and development organization that provides scientific and technical expertise in applying state-of-the-art technologies to support the NIH Intramural Research Program (IRP). Working with NIH's Institutes and Centers (ICs), DCB develops leading-edge computational methods and tools to solve complex biomedical laboratory and clinical research problems.
- The High Performance Computing and Informatics Office responds to critical demands to develop capabilities in new areas, including:
  - Portfolio analysis
  - Text mining and analytics
  - Machine learning
  - Knowledge-based systems
  - High-end computing
  - Scientific visualization

# WHY VISUALIZE THE NIH PORTFOLIO?

---

- What questions do we want to ask?
  - What do we want to measure?
- Public health impact
  - How has NIH funding affected health?
- Research management
  - Decision support tools, spending trends, ROI
- Discovery of new areas of research
  - novel insights, lead to new programs(RFA/PA)

# PVIZ COMPONENTS

---

- Visualization of categorical information
  - Tree Map – display hierarchical data
  - Aduna – visualize overlaps between categories
- Exploratory analysis and visualization
  - Circles – visualization of Lingo3G clustering
  - FoamTree – alternative visualization of Lingo3G clustering
  - Aduna – overlaps between clusters

# DATA SOURCES AND MANAGEMENT

---

- NIH project types
  - Extramural grant awards
  - Intramural research projects
  - Research and development contracts
  - Inter Agency Agreements
- Database
  - IMPACII
- FY 2007 – FY2011
- Integrated QVR carts
  - Build cart in QVR, visualize in PVIZ
- Custom portfolios
  - Upload projects from IC specific data set
- RCDC categories
  - Explore enterprise data

# LIVE DEMONSTRATION

## NIH Portfolio Visualization Tool

The NIH Portfolio Visualization Tool (PVZ) is intended to facilitate the exploration and understanding of the NIH research portfolio. This portfolio is comprised of Extramural Grant Awards, Intramural Research Projects, Research and Development Contracts and Intramural Agreements. The visualizations provide opportunities to discover insights and trends in the NIH research portfolio via QVM cards, updating custom portfolios or NIH RDCB categories.

QVM Cards

My Portfolio

NIH Categories

Create a new app\_side in the QVM application, save that path and then view that card in PVZ. Please click here to log into QVM

Card	Creator	Created	# of Projects
PERSON_1970_2010AF	SENTHILGUS	Jan 26, 2012	511
AKRA EXEMPT REPORTS #2 1-30-12	ALEXANDER	Jan 30, 2012	453
AKRA EXEMPT REPORTS #2 1-30-12	ALEXANDER	Jan 30, 2012	453
AKRA EXEMPT REPORTS 1-30-2012	ALEXANDER	Jan 30, 2012	3023
TEST - HC H6	COLLIER	Jan 30, 2012	2627
PROTEOMICS_CONSORT-11AP112	SENTHILGUS	Jan 29, 2012	426
2011 AND NMAP	COLLIER	Jan 27, 2012	604
WP 2009-2011 AWD	COLLIER	Jan 26, 2012	481
BCMI LAMP4000	COLLIER	Jan 25, 2012	323
HPF LINE	PEARSONP	Jan 23, 2012	1007
RESHOP LINE PF K_H - EDITED	LESERENDEZ	Jan 24, 2012	79
RESHOP PROJECTS LINE PF B04	LESERENDEZ	Jan 24, 2012	76
RESHOP PROJECTS LINE PF B05	LESERENDEZ	Jan 24, 2012	76
RESHOP PROJECTS LINE PF K_H	LESERENDEZ	Jan 24, 2012	79
RCRR Transition to MRLR	NCRK Transition 20	Jan 23, 2012	6

Visualization:

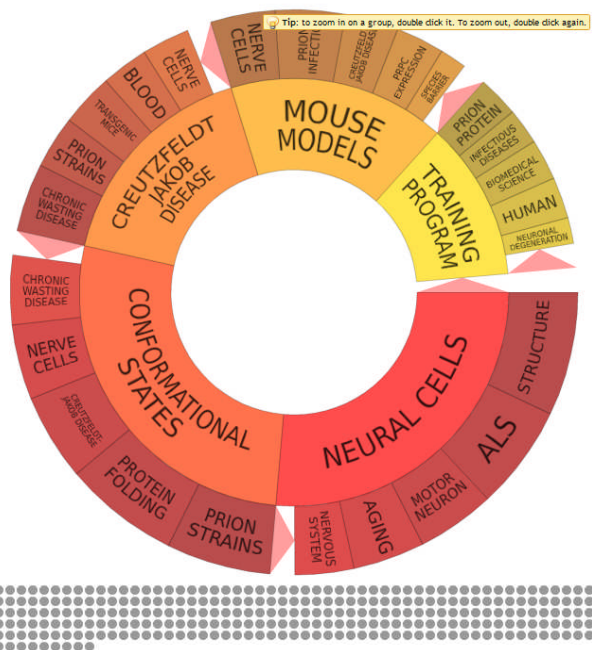
TreeMap

Visualize

Settings

TreeMap displays hierarchical (tree-structured) data as a set of rectangles. The size of the rectangles represents the data value.

NIH Portfolio Visualization Tool



PRION\_1970\_2010AF

Home » RCDC view

Search Data Launch Aduna

Grouped by RCDC

Neurodegenerative

Brain Disorders

Emerging Infectious Diseases

Creutzfeldt-Jakob

Aging

Genetics

Transmissible Spongiform Encephalopathy (TSE)

Bioengineering

Clinical Research - Extramural

Immunization

Vaccine Related

Cancer

Cardiovascular

ALS

Antimicrobial Resistance

Biodefense

Biodefense Research

Tuberculosis

Parkinson's Disease

Huntington's Disease

Mental Health

Endocrine System

Acupuncture

Vector

Human Genome

Neuroscience

All results 769

Active Neurons 130

Study Phases 94

Cell Specific 91

Neurons Project 90

Sleep and Insomnia 83

Biological Rhythms 82

Normal Regulation 80

Number of Disorders 79

Organ Systems 79

Treatment Period 79

Understanding of the ... 78

Related to Circadian 78

Associated with Chronic 78

Specific Clock 78

Behavior in Mice 77

Sleep Pressure 77

Breathing during Sleep 77

Protein Expression 77

Research Plan 77

Gene Expression in SL... 76

Functional Brain Chan... 75

Studies of Obstructive... 74

Sleep Apnea Assoc... 74

Leads to Metabolic 72

Obesity and Sleep 70

Associated with Sleep... 66

Patients with Primary 66

Children's Sleep 65

Depression Associated 63

Light Responses 63

Cardiovascular Diseas... 58

Suprachiasmatic Nucle... 58

Memory and Sleep 55

Stress Associated 53

Studies of Melatonin 48

Syndrome Affects 44

Infant Sleep 36

Upper Airway 33

Pain and Sleep 32

Alcohol Use 25

Melatonin Affects 24

Cluster & view

General

Color model

Groups

Documents

Image export

Options as JavaScript

Sleep Apnea Associated (74)

Active Neurons (130)

Sleep and Insomnia (83)

Biological Rhythms (82)

Licensed to CIT 2010 (max 9 users)

# PVIZ FUTURE ENHANCEMENTS

---

- Visualizing similarity of documents and corpora
  - Multiple similarity metrics (e.g. cosine, Jaccard)
  - Heatmap, circle chart, dendrogram
- Incorporating additional clustering algorithms
  - Latent Dirichlet Allocation (LDA), Kohonen maps.
- Classification, validation, and annotation workflows
- Integrating additional data sources
  - , e.g. literature (Thompson Reuters WOS), patents (USPTO)

# THANKS TO:



NATIONAL  
CANCER  
INSTITUTE



National Institute  
of Allergy and  
Infectious Diseases



National Heart  
Lung and Blood Institute

DPCPSI

DIVISION OF PROGRAM COORDINATION,  
PLANNING, AND STRATEGIC INITIATIVES



National Institutes of Health

National Institute of  
General Medical Sciences

BASIC DISCOVERIES FOR BETTER HEALTH

